PENDING CLAIMS

1   59.   (Currently Amended) An apparatus comprising:

2   a tone detection processor including at least one ~~signal processing unit to perform tone~~

3 ~~detection~~ core processor including at least four signal processing units to perform tone detection;

4 and

5   a storage device to store signal processing instructions for execution by the ~~at least one~~

6 ~~signal processing unit to~~ four signal processing units to:

7   perform automatic gain control (AGC) to normalize the power of a tone or voice

8   signal;

9   determine the energy of the tone or voice signals at specific frequencies utilizing a

10   Goertzel Filter process which implements a plurality of Goertzel filters;

11   determine whether or not a tone is present; and

12   if a tone exists, determine what type of tone~~.~~;

13   wherein the four signal processing units operate in parallel to execute four Goertzel

14   filters, simultaneously, and wherein the four Goertzel filters process data frames of the

15   tone or voice signal that are of fixed size.

1   60.   (Original) The apparatus of claim 59, wherein determining what type of tone

2 includes determining whether the tone is one of a dial tone, a busy tone, a fast busy tone, a

3 ringing tone, or a fax tone.

1   61.   (Original) The apparatus of claim 59, wherein, Goertzel filters compute the

2 energy levels of tone or voice signals at 16 specific frequencies.

1   62.   (Canceled)

1   63.   (Currently Amended) The apparatus of claim 59, wherein the signal processing

2 instructions further for execution by the ~~at least one signal processing unit~~ four signal processing

3 units to further, determine two maximum energy levels of the tone or voice signal and their

4 associated frequencies, respectively, utilizing Goertzel filters.

1   64.   (Currently Amended) The apparatus of claim 63, wherein the signal processing

2   instructions further for execution by the ~~at least one signal processing unit~~ four signal processing

3   units to further, based upon the two maximum energy levels of the tone signal and the associated

4   frequencies of the tone signal, discriminate whether the tone is a single tone, a dual tone, silence,

5   or another type of tone.

1   65.   (Currently Amended) The apparatus of claim 64, wherein the signal processing

2   instructions further for execution by the ~~at least one signal processing unit~~ four signal processing

3   units to further, if the tone was discriminated as a single tone or dual tone, determine the tone by

4   identifying the tone in a user defined dictionary of tones.

1   66.   (Currently Amended) The apparatus of claim 65, wherein the signal processing

2   instructions further for execution by the ~~at least one signal processing unit~~ four signal processing

3   units to further, update a state to TONE ON.

1   67.   (Currently Amended) The apparatus of claim 65, wherein the signal processing

2   instructions further for execution by the ~~at least one signal processing unit~~ four signal processing

3   units to further, determine if a next tone is the same as the tone identified in the user defined

4   dictionary and, if so, increment a TONE ON counter.

1   68.   (Currently Amended) The apparatus of claim 67, wherein the signal processing

2   instructions further for execution by the ~~at least one signal processing unit~~ four signal processing

3   units to further, when the next tone is not the same as the tone identified in the user defined

4   dictionary,

5   determine if an OFF cadence value is defined; and

6   if so, set a state to TONE ON/OFF.

1   69.   (Currently Amended) The apparatus of claim 67, wherein the signal processing

2   instructions further for execution by the ~~at least one signal processing unit~~ four signal processing

3   units to further, when the next tone is not the same as the tone identified in the user defined

4   dictionary,

5   determine if an OFF cadence value is defined; and

6   if not, determine whether the tone identified in the user defined dictionary satisfies an ON

7   cadence value; and

8   if so, declare the tone.

1   70.   (Currently Amended) The apparatus of claim 68, wherein the signal processing

2   instructions further for execution by the ~~at least one signal processing unit~~ four signal processing

3   units to further, increment a TONE OFF counter if a subsequent tone or voice signal includes

4   silence.

1   71.   (Currently Amended) The integrated tone detection processor of claim 68,

2   wherein the signal processing instructions further for execution by the ~~at least one signal~~

3   ~~processing unit~~ four signal processing units to further, if a subsequent tone or voice signal does

4   not include silence,

5   determine if the tone identified in the dictionary satisfies an ON cadence value and an

6   OFF cadence value; and

7   if so, declare a tone.

1   72.   (Currently Amended) A method comprising:

2   performing automatic gain control (AGC) to normalize the power of the tone or voice

3   signal;

4   determining the energy of tone or voice signals at specific frequencies utilizing a Goertzel

5   Filter process which implements a plurality of Goertzel filters wherein a core processor including

6   at least four signal processing units execute the Goertzel filters, simultaneously;

7   determining whether or not a tone is present; and

8   if a tone exists, determining what type of tone.;

9   wherein the four signal processing units operate in parallel to execute four Goertzel

10   filters, simultaneously, and wherein the four Goertzel filters process data frames of the tone or

11   voice signal that are of fixed size.

1   73.   (Original) The method of claim 72, wherein determining what type of tone
2   includes determining whether the tone is one of a dial tone, a busy tone, a fast busy tone, a
3   ringing tone, or a fax tone.

1   74.   (Original) The method of claim 72, wherein, Goertzel filters compute the energy
2   levels of tone or voice signals at 16 specific frequencies.

1   75.   (Original) The method of claim 72, further comprising, determining two
2   maximum energy levels of the tone or voice signal and their associated frequencies, respectively,
3   utilizing Goertzel filters.

1   76.   (Original) The method of claim 75, wherein based upon the two maximum
2   energy levels of the tone signal and the associated frequencies of the tone signal, further
3   comprising, discriminating whether the tone is a single tone, a dual tone, silence, or another type
4   of tone.

1   77.   (Original) The method of claim 76, wherein if the tone was discriminated as a
2   single tone or dual tone, further comprising, determining the tone by identifying the tone in a user
3   defined dictionary of tones.

1   78.   (Original) The method of claim 76, further comprising, updating a state to TONE
2   ON.

1   79.   (Original) The method of claim 76, further comprising, determining if a next tone
2   is the same as the tone identified in the user defined dictionary and, if so, incrementing a TONE
3   ON counter.

1   80.   (Original) The method of claim 79, further comprising, when the next tone is not
2   the same as the tone identified in the user defined dictionary,
3   determining if an OFF cadence value is defined; and
4   if so, setting a state to TONE ON/OFF.

1   81.   (Original) The method of claim 79, further comprising, when the next tone is not

2   the same as the tone identified in the user defined dictionary,

3   determining if an OFF cadence value is defined; and

4   if not, determining whether the tone identified in the user defined dictionary satisfies an

5   ON cadence value; and

6   if so, declaring the tone.

1   82.   (Original) The method of claim 80, further comprising, incrementing a TONE

2   OFF counter if a subsequent tone or voice signal includes silence.

1   83.   (Original) The method of claim 80, further comprising, if a subsequent tone or

2   voice signal does not include silence,

3   determining if the tone identified in the dictionary satisfies an ON cadence value and an

4   OFF cadence value; and

5   if so, declaring a tone.

1   84.   (Original) A machine-readable medium having stored thereon instructions, which

2   when executed by a machine, causes the machine to perform operations comprising:

3   performing automatic gain control (AGC) to normalize the power of the tone or voice

4   signal;

5   determining the energy of tone or voice signals at specific frequencies utilizing a Goertzel

6   Filter process which implements a plurality of Goertzel filters <u>wherein a core processor including</u>

7   <u>at least four signal processing units execute the Goertzel filters, simultaneously</u>;

8   determining whether or not a tone is present; and

9   if a tone exists, determining what type of tone.;

10   <u>wherein the four signal processing units operate in parallel to execute four Goertzel</u>

11   <u>filters, simultaneously, and wherein the four Goertzel filters process data frames of the tone or</u>

12   <u>voice signal that are of fixed size.</u>

1   85.   (Original) The machine-readable medium of claim 84, wherein determining what

2   type of tone includes determining whether the tone is one of a dial tone, a busy tone, a fast busy

3   tone, a ringing tone, or a fax tone.

1   86.   (Original) The machine-readable medium of claim 84, wherein, Goertzel filters

2   compute the energy levels of tone or voice signals at 16 specific frequencies.

1   87.   (Canceled)

1   88.   (Original) The machine-readable medium of claim 84, further comprising,

2   determining two maximum energy levels of the tone or voice signal and their associated

3   frequencies, respectively, utilizing Goertzel filters.

1   89.   (Original) The machine-readable medium of claim 88, wherein based upon the

2   two maximum energy levels of the tone signal and the associated frequencies of the tone signal,

3   further comprising, discriminating whether the tone is a single tone, a dual tone, silence, or

4   another type of tone.

1   90.   (Original) The machine-readable medium of claim 89, wherein if the tone was

2   discriminated as a single tone or dual tone, further comprising, determining the tone by

3   identifying the tone in a user defined dictionary of tones.

1   91.   (Original) The machine-readable medium of claim 90, further comprising,

2   updating a state to TONE ON.

1   92.   (Original) The machine-readable medium of claim 90, further comprising,

2   determining if a next tone is the same as the tone identified in the user defined dictionary and, if

3   so, incrementing a TONE ON counter.

1   93.   (Original) The machine-readable medium of claim 92, further comprising, when

2   the next tone is not the same as the tone identified in the user defined dictionary,

3   determining if an OFF cadence value is defined; and

4   if so, setting a state to TONE ON/OFF.

1   94.   (Original) The machine-readable medium of claim 92, further comprising, when

2 the next tone is not the same as the tone identified in the user defined dictionary,

3   determining if an OFF cadence value is defined; and

4   if not, determining whether the tone identified in the user defined dictionary satisfies an

5 ON cadence value; and

6   if so, declaring the tone.

1   95.   (Original) The machine-readable medium of claim 93, further comprising,

2 incrementing a TONE OFF counter if a subsequent tone or voice signal includes silence.

1   96.   (Original) The machine-readable medium of claim 93, further comprising, if a

2 subsequent tone or voice signal does not include silence,

3   determining if the tone identified in the dictionary satisfies an ON cadence value and an

4 OFF cadence value; and

5   if so, declaring a tone.